DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

2. **Claim 13 is objected** to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1-12 and 14 are rejected** under **35 U.S.C. 103(a)** as being **unpatentable over Rosenberg et al. (US 2001/0035854)**, hereinafter referred to as Rosenberg, **in view of Cruz-Hernandez et al. (US 2005/0007342)**, hereinafter referred to as Cruz-Hernandez.

Regarding claim 1, Rosenberg teaches A haptic function-provided input device (touchpad 16 of fig 1) that performs touch operation to slide on an input

detection (planar, rectangular smooth surface exhibited in fig 1) plane (paragraph 24 and 23, fig 1), said device comprising: input detection (touchpad 16 of fig 1) unit, which has the input detection plane (see touchpad 16 of fig 1), that detects a touching position of an operation body and a sliding speed of the operation body (paragraph 25, 24, and 23, fig 1); computation unit (host computer or local processor) configured to compute a vibration pattern (increasing vibrating frequency voltage profile, disclosed in paragraph 60, reads on computing 'a vibration pattern' as each speed produces a unique vibration pattern voltage profile, see paragraph 60) based on the sliding speed detected by the input detection unit (paragraph 32, 55, 53, and 57, fig 1 and 7); and vibration unit (piezoelectric actuator 42 of fig 3) for vibrating the input detection plane based on the vibration pattern computed by the computation unit (paragraph 37, 35-36, and 38-39, fig 3).

Paragraph 60, Rosenberg discloses 'vibrations of different frequency (i.e. can be reasonably interpreted as vibration patterns, since applicant fails to distinctly point out and define such vibration patterns) can each be used to differentiate different events or different characteristics of events...' As such, examiner contends it can reasonably be interpreted the computation of vibrations at different frequencies, as taught by Rosenberg can be reasonably and/or broadly interpreted as analogous to the claimed '**computation unit for computing a vibration pattern**...' Therefore, examiner contends Rosenberg reasonably discloses so that one of ordinary skill in the art would understand a

computation unit (host computer or local processor) for computing a vibration pattern, see paragraph 60.

Applicant states in paragraph 77 of their specification, 'the input detection section (i.e. input detection means) 24 may be an input device such as a resistance film typed one, a surface acoustic wave (AW) typed one, an optical typed one, or a multiple-stage typed tact switch', Rosenberg teaches touchpad 16 of fig 1 can be capacitive, resistive, or other sensing means, see paragraph 24. Applicant states in paragraph 80, a CPU constitutes an example of computational means. Applicant states in paragraphs 69 and 73, '...actuators 25a and 25b constituting the vibration means...Each of the actuators 25a-25f is constituted of a piezoelectric sheet or a piezoelectric element.'

However, Rosenberg fails to explicitly teach wherein the computation unit is configured to compute the vibration pattern further based on a shift in an excitation timing between two actuators of the vibration unit.

In a similar field of endeavor, Cruz-Hernandez discloses Haptic devices having multiple operational modes including at least one resonant mode. **In particular, Cruz-Hernandez teaches** wherein the computation unit is configured to compute the vibration pattern further based on a shift in an excitation timing (steps 1130, 1140, and 1150 all of fig 13) between two actuators (first E-M device and/or second E-M device exhibited in fig 13) of the vibration unit (paragraph 55-56, 44-48, and 26, fig 7 and 13).

Therefore, it would've been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Rosenberg by incorporating

the teachings of Cruz-Hernandez for the purpose of manufacturing an electro-mechanical transducer that is configured to produce vibrotactile feedback having a relatively high magnitude and/or an adjustable bandwidth and that can generate haptic feedback having relatively low energy consumption, As taught by Cruz-Hernandez, see paragraph 4.

Examiner maintains applicant discloses in paragraph 126 of its specification, 'According to the method of the present invention, one standard sliding condition is set. In this embodiment, a shift in excitation timing (i.e frequency) between the two actuators 25e and 25f at the standard sliding speed Vo, that is, at a **standard time** thereof is to a **set vibration shift time** t'. With respect to this, **a vibration time difference T' between** the **actuators** 25e and 25f **varies** in accordance **with the sliding speed Vx of the operator's finger** 30a as shown in FIGS. 10A and 10B. Cruz-Hernandez discloses resonant frequencies f_1 510 of fig 7, f_2 520 of fig 7, and f_3 530 of fig 7 in paragraph 44-48. Examiner contends it is well known in the art, through routine skill in the art, judicious placement of frequencies, f_1-f_3, achieve said vibration shift time and varied vibration time difference.

Regarding claim 5, Rosenberg it is rejected for the same rationale as the rejection of claim 1. Claim 1 is the apparatus claim that renders the method claim, claim 5, fully operational by virtue of every claim limitation of claim 1.

Regarding claim 9, Rosenberg teaches An electronic device (computer 10 of fig 1) comprising a haptic function-provided input device (touchpad 16 of fig 1) that performs touch operation to slide on an input detection plane and display

means (display device 12 of fig 1) for displaying a display image based on information input by the input device (paragraph 22-25 and paragraphs 53-57, fig 1 and 7), wherein said input device includes an input detection unit (touchpad 16 of fig 1), which has the input detection plane (planar, rectangular smooth surface exhibited in fig 1), that detects a touching position of an operation body and a sliding speed of the operation body (paragraph 25, 24, and 23, fig 1); computation means (host computer or local processor) for computing a vibration pattern based on the sliding speed detected by the input detection unit (paragraph 32, 55, 53, and 57, fig 1 and 7); and a vibration unit (piezoelectric actuator 42 of fig 3) for vibrating the input detection plane based on the vibration pattern computed by the computation means (paragraph 37, 35-36, and 38-39, fig 3).

Paragraph 60, Rosenberg discloses 'vibrations of different frequency (i.e. can be reasonably interpreted as vibration patterns, since applicant fails to distinctly point out and define such vibration patterns) can each be used to differentiate different events or different characteristics of events…' As such, examiner contends it can reasonably be interpreted the computation of vibrations at different frequencies, as taught by Rosenberg can be reasonably and/or broadly interpreted as analogous to the claimed '**computation unit for computing a vibration pattern**…' Therefore, examiner contends Rosenberg reasonably discloses so that one of ordinary skill in the art would understand a computation unit (host computer or local processor) for computing a vibration pattern, see paragraph 60.

Applicant states in paragraph 77 of their specification, 'the input detection section (i.e. input detection means) 24 may be an input device such as a resistance film typed one, a surface acoustic wave (AW) typed one, an optical typed one, or a multiple-stage typed tact switch', Rosenberg teaches touchpad 16 of fig 1 can be capacitive, resistive, or other sensing means, see paragraph 24. Applicant states in paragraph 80, a CPU constitutes an example of computational means. Applicant states in paragraphs 69 and 73, '...actuators 25a and 25b constituting the vibration means...Each of the actuators 25a-25f is constituted of a piezoelectric sheet or a piezoelectric element.'

However, Rosenberg fails to explicitly teach wherein the computation means computes the vibration pattern further based on a shift in an excitation timing between two actuators of the vibration unit.

In a similar field of endeavor, Cruz-Hernandez discloses Haptic devices having multiple operational modes including at least one resonant mode. **In particular, Cruz-Hernandez teaches** wherein the computation unit is configured to compute the vibration pattern further based on a shift in an excitation timing (steps 1130, 1140, and 1150 all of fig 13) between two actuators (first E-M device and/or second E-M device exhibited in fig 13) of the vibration unit (paragraph 55-56, 44-48, and 26, fig 7 and 13).

Therefore, it would've been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Rosenberg by incorporating the teachings of Cruz-Hernandez for the purpose of manufacturing an electro-mechanical transducer that is configured to produce vibrotactile feedback having

a relatively high magnitude and/or an adjustable bandwidth and that can generate haptic feedback having relatively low energy consumption, As taught by Cruz-Hernandez, see paragraph 4.

Examiner maintains applicant discloses in paragraph 126 of its specification, 'According to the method of the present invention, one standard sliding condition is set. In this embodiment, a shift in excitation timing (i.e frequency) between the two actuators 25e and 25f at the standard sliding speed Vo, that is, at a **standard time** thereof is to a **set vibration shift time** t'. With respect to this, **a vibration time difference T' between** the **actuators** 25e and 25f **varies** in accordance **with the sliding speed Vx of the operator's finger** 30a as shown in FIGS. 10A and 10B. Cruz-Hernandez discloses resonant frequencies f_1 510 of fig 7, f_2 520 of fig 7, and f_3 530 of fig 7 in paragraph 44-48. Examiner contends it is well known in the art, through routine skill in the art, judicious placement of frequencies, f_1-f_3, achieve said vibration shift time and varied vibration time difference.

Regarding claim 2, Rosenberg teaches The haptic function-provided input device according to claim 1, wherein the computation unit computes a vibration pattern of the input detection plane to generate vibrations from a low frequency and small amplitude to a high frequency and a large amplitude, as the operation body goes away from a position where the operation body has touched the input detection plane (paragraph 55, fig 7).

Regarding claim 3, Rosenberg teaches The haptic function-provided input device according to claim 1, further comprising: a control unit configured to control input information variably based on the sliding speed (paragraph 25).

Regarding claim 4, Rosenberg teaches The haptic function-provided input device according to claim 1, further comprising: a control unit configured to control input information variably based on distance information on a distance from a point where the operation body touches the input detection plane to a point where its sliding then stops (paragraph 37 and 55).

Regarding claim 6, Rosenberg teaches The information input method according to claim 5, wherein when computing the vibration pattern, a vibration pattern of the input detection plane to generate vibrations from a low frequency and a small amplitude to a high frequency and a large amplitude is computed, as the operation body goes away from a position where the operation body has touched the input detection plane paragraph 55, fig 7).

Regarding claim 7, Rosenberg teaches The information input method according to claim 5, wherein an amount of the input information is adjusted on the basis of the sliding speed (paragraph 25).

Regarding claim 8, Rosenberg teaches The information input method according to claim 5, wherein the input information is selected on the basis of distance information on a distance from a point where the operation body touches the input detection plane to a point where a sliding of the operation body then stops (paragraph 37 and 55).

Regarding claim 10, Rosenberg teaches The electronic device according to claim 9, wherein the computation means computes a vibration pattern of the input detection plane to generate vibrations from a low frequency and a small amplitude to a high frequency and a large amplitude, as the operation body goes away from a position where the operation body has touched the input detection plane paragraph 55, fig 7).

Regarding claim 11, Rosenberg teaches The electronic device according to claim 9, further comprising: control means for controlling the input information variably based on the sliding speed (paragraph 25).

Regarding claim 12, Rosenberg teaches The electronic device according to claim 9, comprising control means for controlling the input information variably based on distance information on a distance from a point where the operation body touches the input detection plane to a point where a sliding of the operation body then stops (paragraph 37 and 55).

Regarding claim 14, Cruz-Hernandez teaches The haptic function-provided input device according to claim 1, wherein, when the sliding speed of the operation body is less than a predetermined sliding speed, the vibration pattern includes a first number of waves, and, when the sliding speed of the operation body is greater than the predetermined sliding speed, the vibration pattern includes a second number of waves less than the first number of waves (paragraph 44-48, fig 7 and 13).

Therefore, it would've been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Rosenberg by incorporating

the teachings of Cruz-Hernandez for the purpose of manufacturing an electro-mechanical transducer that is configured to produce vibrotactile feedback having a relatively high magnitude and/or an adjustable bandwidth and that can generate haptic feedback having relatively low energy consumption, As taught by Cruz-Hernandez, see paragraph 4.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Eid et al. (US 2007/0057913) discloses Methods and systems for providing haptic messaging to handheld communication devices. Teirling et al. (US 2005/0134561) discloses System and method for mapping instructions associated with haptic feedback.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TONY DAVIS whose telephone number is (571)270-5586. The examiner can normally be reached on M-Th 7:30 a.m.-6 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quan-Zhen Wang can be reached on 571-272-3114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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